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DETERMINANTS OF BRAND EQUITY IN E-BUSINESSES: AN EXPLORATORY STUDY

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Abstract

Previous research suggests that brand equity is affected by marketing mix elements, such as store image or distribution intensity. However, because the Internet has no boundaries, some of these elements may not be applicable in building the brand equity of online companies. In this study, we identify factors pertaining to online contexts that may affect consumers' perception on quality and brand knowledge, both of which are found to be important determinants of brand equity. By performing confirmatory factor analyses on a set of survey data, we show that having a high quality Website and innovative products and technologies may help reinforce consumers' perceived quality. However, popular online marketing instruments, such as offering value-added services and features or advertising, may not contribute much to the formation of online firms' brand equity.

Keywords: Brand equity, Website quality, value-added services and features, advertising intensity, product or technology leadership, perceived quality, brand knowledge

1 INTRODUCTION

The widespread acceptance of the Internet and electronic commerce has given rise to popular brand names such as Amazon, eBay, Hotmail, and Yahoo!. Although the Internet is often characterized as an efficient channel that reduces search and transaction costs, it also intensifies product and price competition due to the use of intelligent tools, such as comparison shopping agents. To differentiate products from competitors and appeal to online buyers, Websites often need to go beyond pure product developments or appropriate pricing by introducing innovative business practices and technologies and adding value for consumers. Such efforts lead to the formation of unique, firm-associated impressions commonly known as brands.

A brand is a name and/or symbol such as a logo, trademark, or package design that uniquely identifies products or services of a seller or a group of sellers, and differentiates them from those of its competitors (Aaker 1991; Keller 1998; Kotler 1994). A good brand enhances the utility or value associated with a particular product. Such extra value due to the brand is commonly called brand equity (Farquhar 1990). Because brand influences consumer choices, firms are advised to invest, protect, and nurture their brands so as to build up higher brand equities (Aaker 1996; Keller 1993).

Keller (1998) suggests that a brand is built by the creation of firm-associated mental structures, which help consumers organize their knowledge in a way that aids in their brand selection decisions and strategies. For instance, being the first online bookstore that carries an extensive catalog, Amazon has enjoyed substantial brand advantage in online book retailing. Despite the aggressive challenge by Barnes and Noble, the leading brick-and-mortar bookstore, Amazon is persistently the market leader among all online book retailers.

Prior research has identified various marketing mix elements, such as product pricing, promotion, store image, advertising spending, and distribution intensity, that affect consumers' mental structures related to brand equity (Yoo et al. 2000). However, because Internet stores have no boundaries and are constantly available, some of these factors may not directly apply to online businesses. For instance, the concept of store image needs to be redefined for online firms because the "stores" are largely represented by the firms' Websites. Similarly, in e-business contexts, the concept of distribution intensity no longer applies because the Internet is ubiquitous: consumers can access e-business stores anytime, anywhere. Therefore, the brand equity of an online firm is likely shaped by a different set of factors pertaining more to Website characteristics and technological attributes.

In this research, we identify factors that affect consumers' perception of online brands and test a model of e-business brand equity formation using a confirmatory approach. By estimating the model, we provide managerial guidance to online companies regarding the strategic resources that could be put into enhancing brand equity.

2 LITERATURE REVIEW

Previous research suggests that brand equity is composed of both attitudinal and behavioral dimensions (Cobb-Walgren et al. 1995). Aaker (1991, 1996) posits that brand could be represented by customer loyalty, perceived quality, brand awareness, associations and objective indicators such as proprietary assets (patents, trademarks, etc.), or market shares. These are largely customer-driven dimensions that are not directly controllable by companies. Based on this framework, a successful brand building strategy requires skillful maneuvering of customer perceptions. This is often achieved through carefully designed marketing mix elements.

In a related discussion, Keller (1993, 1998) highlights the importance of brand knowledge in determining brand equity. Brand equity is conceptualized through the knowledge structures of brands in the minds of consumers; consumers' familiarity and memory associations of brand are important drivers to brand perceptions, and they are susceptible to influences brought about by firms' marketing activities. In this perspective, brand equity exists when consumers are aware of a brand and hold some favorable, strong, and unique brand associations in memory. Consumers' product preference is based upon brand associations and how such associations differ from those of competitors.

Both the Aaker and Keller brand equity models emphasize the importance of attitudinal variables related to consumers' brand perception and knowledge. Although behavioral indicators such as actual brand choices, loyalty, or stock prices may help define brand equity, due to the volatile nature of the markets, it is often difficult to consistently measure these variables for e-businesses. Besides, instead of contributing to brand formation, such behavioral indicators might reflect the consequences due to brand influence. That is, they might be endogenous to brand equity. It might not be appropriate to use them as independent variables to predict the formation of brand equity.

Our e-business brand equity model is constructed based on Aaker's and Keller's conception of brand equity. Specifically, we hypothesize a three-tier relationship, where brand equity is formed by consumers' brand perceptions (exemplified by perceived quality and brand knowledge),¹ and their perceptions are in turn affected by marketing tools that could be directly manipulated by online companies.

3 CONCEPTUAL MODEL

Figure 1 presents our conceptual model. The first branch constructs include marketing mix elements—value-added services and features, advertising intensity, Website quality, and product or technology leadership—that are commonly set up or offered by

¹Brand knowledge is a higher-level construct that subsumes awareness and associations (Aaker 1991; Keller 1993).

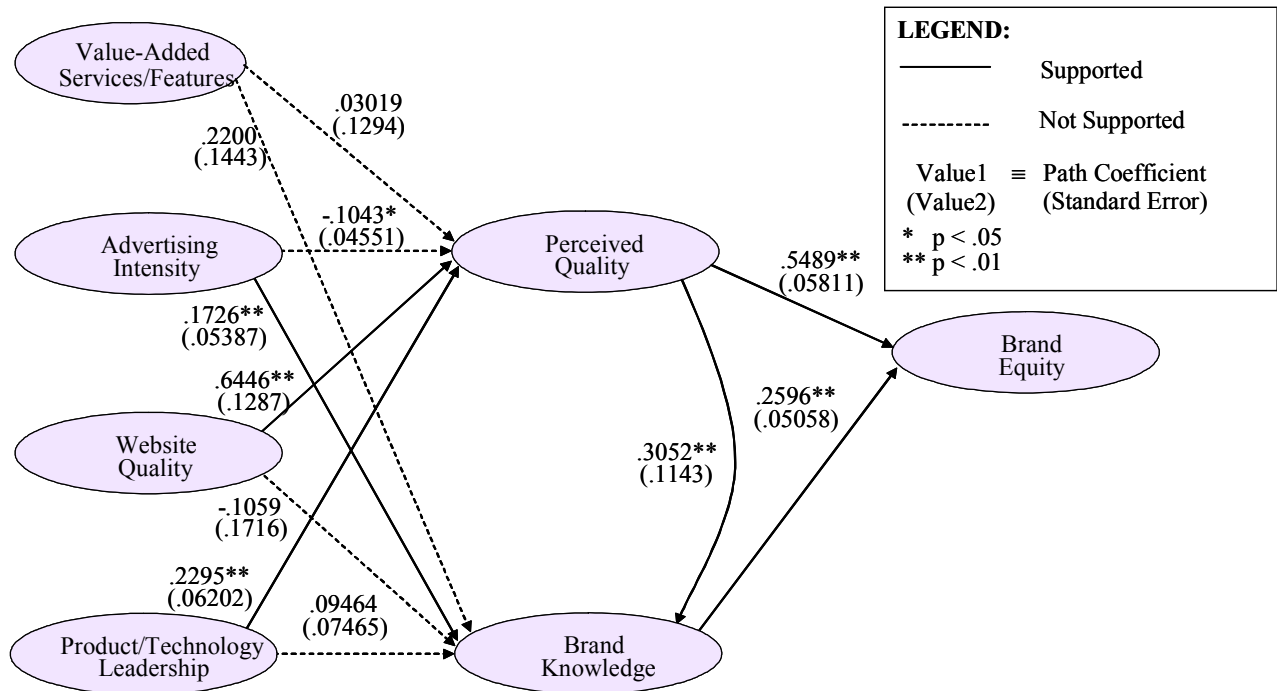


Figure 1. The E-Business Brand Equity Model

online companies.² It is posited that they contribute to the quality perceptions and brand knowledge of consumers. Further, we allowed for correlations between the first branch elements to capture common variations exhibited by all the elements (Hair et al. 1998).

Value-added services and features refer to the quality of peripheral tools or functionalities provided by online firms to consumers at any point of interaction. They serve to enhance experience in using the main products or services provided by the companies for both experienced and novel consumers. For instance, many Internet stores offer instant help and support to improve the purchase or consumption experience of consumers; online stockbrokers often provide value-added utilities, such as portfolio management or trend analysis tools, to stock traders.

Such value-added services and features play a significant role in shaping consumers' attitude toward a brand by assuring that consumers' welfare is important to the firm (Sivadas and Baker-Prewitt 2000). Further, they might improve consumer satisfaction and strengthen the brand association in consumers' memory (Anderson et al. 1994; Bitner et al. 1994; Sivadas and Baker-Prewitt 2000). Better value-added services and features might also result in a higher perceived quality, because they directly improve the consumption experience of consumers. Our first two hypotheses are formulated as follows.

- H1a: The quality of value-added services and features is positively related to perceived quality.
- H1b: The quality of value-added services and features is positively related to brand knowledge.

Advertising intensity is defined as the amount of exposure that consumers have to the advertisements of a brand. In the e-business context, advertising intensity is often increased by using pop-up browser windows or banner advertisements.

There is a widespread agreement that advertising is one of the major contributors to brand equity (Aaker and Biel 1993; Cobb-Walgren et al. 1995). Advertisements provide information about objective product attributes, and they are controllable by

²In conventional retailing, marketers often emphasize the importance of four "P's": product, place, promotion and price. The marketing mix elements in our model capture the product, place and promotion aspects in the Internet context. We did not include price because many Internet stores sell similarly designed and priced products. Further, many online firms derive revenue from other sources, such as advertisements, and offer free products and services.

companies to create positive brand associations (Cobb-Walgren et al. 1995; Stigler 1961). When such associations are stored in accessible memory, they could be translated into non-conscious but reliable behavioral predispositions (Krishnan and Chakravarti 1993). Yoo et al. (2000) suggest that advertising could be an effective way to develop, shape, and manage brand awareness or associations.

Being an important extrinsic cue signaling product quality, advertising can also influence the perceived quality and usage experience of a brand. A firm that invests heavily in a brand is indirectly showing that its product or service is of superior quality (Kirmani and Wright 1989). It was also suggested that advertising spending and perceived quality were correlated, and intensive advertising might improve the perceived quality of experience goods (Light 1990; Nelson 1974).

H1c: Advertising intensity is positively related to perceived quality.

H1d: Advertising intensity is positively related to brand knowledge.

In an online context, a Website is equivalent to a firm's retail store. Website quality captures characteristics pertaining to reliability and user interface. Reliability refers to the level of security and transmission delays, whereas user interface refers to the front-end design of the Website (i.e., whether consumers are comfortable interacting with the Website).

The core asset of firms in e-businesses is their Websites. Ensuring that consumers are accessing a Website that is of top quality is important in brand management. According to Breen (1999), the download time of Webpages directly influences consumers' experience. Websites that take too long or even fail to be accessed can cause frustration and displeasure, and eventually they might lead to the formation of negative firm impressions. User interface helps to establish bonds with consumers and create good first impressions. User-friendly, attractive, informative, and interactive Websites have greater appeal to consumers, thereby resulting in stronger brand associations. Hence, consumers might perceive a better quality and be more knowledgeable of online firms that have good Website quality

H1e: Website quality is positively related to perceived quality.

H1f: Website quality is positively related to brand knowledge.

Product or technology leadership indicates how forefront a brand is in the market. Product leadership refers to the extent to which firms introduce innovative products or services; technology leadership refers to the use of state-of-the-art technologies in business activities.

Having product or technology leadership helps a firm capture its targeted market when there is relatively little competition (Robinson 1988). Firms can use this opportunity to establish standards, preferences (Carpenter and Nakamoto 1989; Robinson et al. 1994; Schmalensee 1982), or a strong brand name before competitors with similar features enter the market. Further, firms must channel resources to research and development in order to bring consumers newer features and designs. Such research activities might impress consumers and induce them to form more favorable brand associations (Carpenter and Nakamoto 1989).

The impact of technological advancements on brand management cannot be neglected (Shocker et al. 1994). Firms that use and are constantly in pace with or ahead of current technological advancements might create a more positive impression on consumers. When firms invest in their brands for possible improvements, enhancements, and future extensions, and channel resources to differentiate themselves from competing brands, they might also improve their quality from consumers' perceptions (Robinson 1988).

H1g: The degree of product or technology leadership is positively related to perceived quality.

H1h: The degree of product or technology leadership is positively related to brand knowledge.

In the second branch of the model, consumer-based factors that contribute to brand equity were examined. Based on the aforementioned theoretical frameworks (Aaker 1996; Keller 1993), a strengthening of these factors helps build and maintain brand equity.

Aaker (1991) and Zeithaml (1988) define perceived quality as consumers' perception of the overall quality or superiority of a product or service with respect to its intended purposes, relative to alternatives. Perceived quality depends on personal product or service experience, unique needs, and consumption situations (Yoo et al. 2000). Consumers who perceive a brand to be of high quality recognize the superiority of a brand. Therefore, they might associate a higher value (or utility) to the brand when compared with other alternatives. Further, the consumers may derive greater satisfaction and form a more positive brand image

if their quality expectations are reinforced by actual consumption experience. Higher perceived quality might also lead to favorable brand associations in memory, which implies a higher level of perceived brand knowledge.

H2a: Perceived quality is positively related to brand equity.

H2b: Perceived quality is positively related to brand knowledge.

The accumulation of product or service knowledge by consumers, due to exposure to a brand, results in the formation of brand knowledge. Keller (1993) defines brand knowledge in terms of two components: brand image and brand awareness. Brand image is a set of brand associations that are usually arranged in some meaningful but complex and interlinked manner. Awareness is the ability of the consumer to recognize or recall a brand. In this study, we examine the higher-level construct “knowledge” because awareness and associations are closely related to each other; brand associations indirectly imply brand awareness (Yoo et al. 2000).

The importance of brand knowledge to consumer decisions has been well documented (Alba et al. 1991). Variations in favorability, strength, and uniqueness of brand associations are important in creating differential response that contributes to brand equity, especially in high involvement decision settings (Keller 1993). Prior research has also suggested that consumers might adopt a decision rule to buy only familiar brands (Jacoby et al. 1977; Roselius 1971). In low-involvement decision settings, people may base their selections on brand awareness (Petty and Cacioppo 1986), which is another basic dimension of brand knowledge. Therefore, our last hypothesis is formulated as

H2c: Brand knowledge is positively related to brand equity.

4 METHODOLOGY

Previous brand valuation research has employed both survey-based and financial methods (e.g., Simon and Sullivan 1993). We adopted the self-reported survey approach because our brand equity model in Figure 1 emphasizes consumer-based perceptions. Further, frequent fluctuations or unavailability of stock prices of most e-business firms render the inappropriability of financial-based brand equity measurements.

The survey instruments of advertising intensity, perceived quality, brand knowledge, and brand equity were adopted and modified based on well-tested questionnaire items that were used in previous brand equity research (Aaker 1996; Cobb-Walgren 1995; Motameni and Shahrokhi 1998; Sivadas and Baker-Prewitt 2000; Yoo et al. 2000). By following the similar style and the guidance of related research, we developed the items for value-added services and features, Website quality, and product or technology leadership. Taken together, our initial survey contained a total of 50 items that measure the seven constructs depicted in Figure 1. All questions were framed using a seven-point Likert scale.

To ensure that the survey subjects were familiar with the studied brands, we focused only on two Web-based services: search engine and e-mail. Both of these services are popular among most Internet users. We invited 30 undergraduate students from a computing department of a large university to suggest the top three brands of their choice in each industry. Through this process, we identified the most popular brands in the local context. Based on the feedback, three search engines (AltaVista, Google, and Yahoo!) and three email service providers (Hotmail, Lycos Mail, and Yahoo! Mail) were selected in the final survey. We chose multiple brands and industries to induce higher variations on the responses, which is useful for identifying the model in Figure 1.

The 50-item survey was then customized for each of the above brands, resulting in six survey versions. Except for the brand names and industries, all of the items were identical across the versions. We further conducted two rounds of pilot studies to assess and purify the items. In each round, 24 upper division undergraduate students from a computing program were invited to complete the six versions of the survey. Individual feedback was then collected regarding the layout, structure, and clarity of the survey. We also performed preliminary reliability analyses to identify potential bad items. After the two pilot studies, we discarded, rephrased, and added some items to arrive at the final survey, which contained a total of 48 items. The following are two sample items that were included in the final survey (X = one of the six studied brands).

- The quality of the value-added services/features offered by X is impressive.
- X is intensively advertised on any media.

The six survey versions were then randomly distributed to a pool of undergraduate and postgraduate students in a large university. All subjects were volunteers but they were given monetary incentives to complete the survey. After removing 10 incomplete surveys, we had a total of 392 legitimate responses.³ Among the subjects, 45 percent were females; the majority were between 18 and 25 years of age. Most of our subjects have extensive Internet experience: 65 percent of them spent more than 12 hours per week surfing the Internet.⁴

5 DATA ANALYSIS

We conducted both reliability analyses and confirmatory factor analyses (CFA) to assess the measurement items and test our research model.

5.1 Reliability Analysis

We computed Cronbach's coefficient alphas to assess the internal consistency of the survey items. As shown in Table 1, all alphas were larger than 0.80, which exceeded commonly recommended minimum levels of 0.70 (Nunnally 1978). The measurement items were, therefore, consistent with each other, and the constructs were reliably measured.

Table 1. Cronbach's Coefficient Alpha

Construct	Coefficient Alpha
Value-Added Services/Features	0.86
Advertising Intensity	0.91
Website Quality	0.88
Product/Technology Leadership	0.87
Perceived Quality	0.9
Brand Knowledge	0.95
Brand Equity	0.89

5.2 Confirmatory Factor Analysis

CFA using structural equation modeling (SEM) was performed to examine the factor model and assess the research hypotheses.⁵ We followed the two-step recommendation made by Anderson and Gerbing (1988). First, we assessed the fit of the measurement model and, when necessary, respecified the model to ensure properly measured constructs. The hypotheses were then assessed by estimating a structural model based on the validated constructs.⁶

³The 392 surveys were somewhat equally distributed across the six brands: 65 for AltaVista, 66 for Yahoo!, 68 for Google, 61 for Hotmail, 64 for Lycos Mail, and 68 for Yahoo! Mail.

⁴While student subjects may not represent the majority of e-business consumers, the use of students was deemed appropriate in the present study because 99 percent of them have used services in the selected industries and 84 percent of them had consumption experience with the respective brands. Nevertheless, to improve the generalizability and external validity of this research, future work should extend the coverage to include users from other populations (e.g., working adults) and brands from other online industries.

⁵LISREL 8.51 was used for all SEM analyses.

⁶When examining the SEM model fits and performing model comparisons, we used a more conservative significance level of 0.01 for all χ^2 statistics. This is because the χ^2 statistic is sensitive to sample size, and it would probably reject a model when the sample size is larger than 200, irrespective of the true significance of the model (Hair et al. 1998).

5.2.1 Measurement Model

We first estimated a seven-construct measurement model by including all possible correlations between the constructs. Based on this model, we assessed the discriminant validity of the model by pair-wise comparisons of constructs using χ^2 difference tests. All the χ^2 differences, obtained by subtracting the overall χ^2 of the seven-construct model from the respective six-construct models, were significant. This implies that the items measured distinct constructs.

The initial measurement model revealed a modest fit to the data, with a goodness-of-fit index (GFI) of around 0.79. To identify problematic items, we examined the standardized residual matrix of the estimated model. It was suggested that a good model should have less than 5 percent of standardized residuals with absolute values greater than 2.58 (Hair et al. 1998). Based on this premise, we dropped 22 items that either loaded considerably onto other constructs or did not correlate well with other items of the own constructs. The final measurement model consists of seven constructs that were measured by 26 items. Each construct was measured by a minimum of three items.

To assess convergent validity, we computed Cronbach's coefficient alpha and composite reliability of the items, and the average variance extracted (AVE) per construct. Table 2 reports the results of such computations.

Table 2. Convergent Validity Tests

Construct	Coefficient Alpha	Composite Reliability	Average Variance Extracted
Value-Added Services/Features	0.77	0.78	0.46
Advertising Intensity	0.89	0.9	0.64
Website Quality	0.78	0.78	0.55
Product/Technology Leadership	0.86	0.87	0.69
Perceived Quality	0.81	0.81	0.59
Brand Knowledge	0.92	0.92	0.75
Brand Equity	0.87	0.87	0.63
Recommended Range	.70 and above (Nunnally 1978)	.80 and above (Nunnally 1978)	.50 and above (Fornell and Larcker 1981)

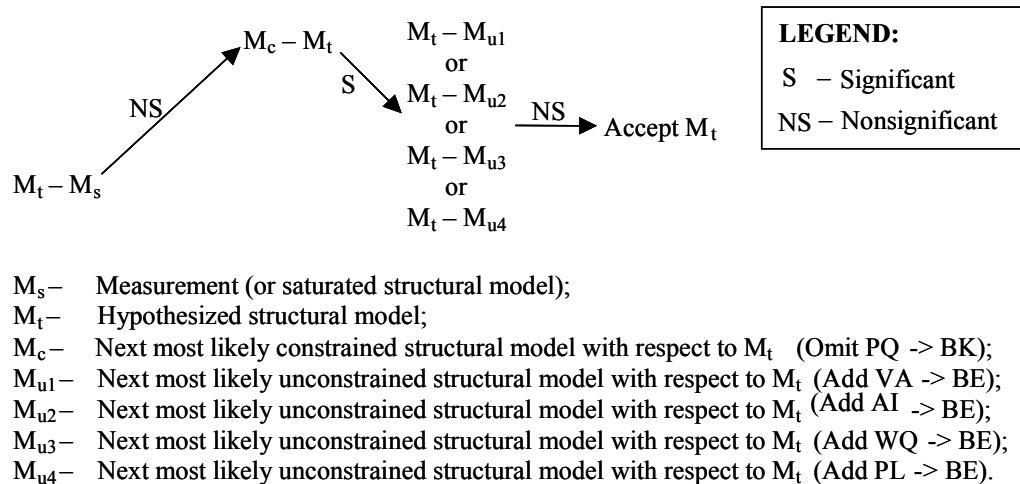
With the exception of value-added services and features and Website quality, all values exceeded commonly recommended levels. The composite reliability and AVE of value-added services and features and the composite reliability of Website quality were marginal, but they were very close to the recommended ranges. All items had standardized loadings exceeding 0.50.

To further assess discriminant validity of the final measurement model, the inter-item correlations were examined (Fornell and Larcker 1981). Using Pearson product-moment correlations, the variance extracted by each construct was larger than its shared variance with other constructs. This indicates a high correlation among items measuring the same constructs, but not across constructs.

5.2.2 Structural Model

We adopted Anderson and Gerbing's (1988, Figure 1) decision-tree framework to assess the fit of the structural model. Figure 2 illustrates the sequential χ^2 difference tests (SCDTs) that we had conducted (we show only the tested branches in Figure 2).

Essentially, the model was compared to a series of competing models. By performing all of the tests depicted in Figure 2, the proposed structural model (M_1 , which is equivalent to Figure 1) was eventually accepted. We report the fit statistics of the measurement model, structural model, and their recommended ranges in Table 3.



VA – Value-Added Services/Features; AI – Advertising Intensity; WQ – Website Quality;
 PL – Product/Technology Leadership; PQ – Perceived Quality; BK – Brand Knowledge; BE – Brand Equity

Figure 2. Model Comparisons Using SCDTs

Table 3. Goodness-of-Fit Measures

LISREL-Provided Measure	Value		Recommended Range ⁺
	Measurement Model	Structural Model	
Goodness-of-Fit Index (GFI)	0.91	0.91	> .90
Root Mean Square Residual (RMSR)	0.05	0.06	< .10
Root Mean Square Error of Approximation (RMSEA)	0.04	0.04	.05 – .08
Adjusted Goodness-of-Fit Index (AGFI)	0.89	0.89	> .80
Non-Normed Fit Index (NNFI)	0.96	0.96	> .90
Normed Fit Index (NFI)	0.92	0.92	> .90

⁺ Based on Sharma (1996) and Hair et al. (1998).

The explanatory power and predictive validity of the structural model were evaluated by inspecting the equation R^2 for the dependent constructs (perceived quality, brand knowledge, and brand equity). The model accounted for 66.08, 25.60, and 49.15 percent of the variance in the three dependent constructs respectively. These values greatly exceeded 10 percent, which was suggested by Falk and Miller (1992) as an indication of substantive explanatory power. Therefore, our model possesses high predictive validity on the formation of brand equity in e-businesses.

The path coefficients and their associated t-values are reported in Figure 1. Six hypotheses were supported by the structural model. Specifically, advertising intensity positively affected brand knowledge, and both Website quality and product or technology leadership positively affected perceived quality. Perceived quality and brand knowledge contributed to the shaping of brand equity, and perceived quality also positively influenced brand knowledge.

6 CONCLUSIONS AND OTHER REMARKS

To our surprise, the quality of value-added services and features did not affect perceived quality or brand knowledge. Several explanations might account for such a finding. First, by nature, value-added services and features are more useful to consumers who are less familiar with the firms' products or services. Given the ample Internet experience of our subjects and the popularity of e-mail and search engines, our subjects might have neglected the add-on functions and features provided by the studied brands. Further research should examine the benefits of such peripheral features to inexperienced Web users and/or more complicated online services. For instance, due to the complexity of different banking services, online banking could be a more suitable testing ground for value-added services and features.

Alternatively, it is possible for consumers to form a predefined set of expectations on the products or services offered by the Websites. Whether such expectations are fulfilled might have dominated their perceptions on quality and brand knowledge. This is more likely to happen with online services that serve a well-defined goal or task objective.

In any case, online firms may wish to review the relevance of their value-added services and features to their targeted consumers. In the case of e-mail and search engines, it appears that providing value through optional services, tools, and utilities is a giveaway to experienced Internet users, and such tools might not have a great impact on building brand equity.

As expected, advertising intensity reinforced consumers' brand knowledge, but it did not contribute to a higher perceived quality. Indeed, based on a two-tailed test, advertising intensity *negatively* affected perceived quality at the 5 percent level. Many online firms use banner advertisements, pop-up windows, and mass e-mails to promote their products and services. However, such excessive advertising may also bring inconvenience and frustration to consumers, which may ultimately drive down the perceived quality of the brand. Taking into account the indirect path, our model shows that advertising intensity had a net *negative* impact on brand equity. Therefore, online firms need to manipulate the nature and extent of advertising with care, and they should avoid over-selling their products. There should be an appropriate mix of online advertising with offline brand communications for a brand to be successful (Breen 1999).

Website quality and product or technology leadership significantly affected perceived quality, but they did not directly heighten the brand knowledge of consumers. This is a surprising result since a high quality Website is analogous to a prestigious store in conventional retailing, whereas product or technology leadership captures firms' commitments in launching good products and services. Both store- and product-related factors have been found to significantly affect brand knowledge in past studies (Keller 1993; Yoo et al. 2000).

The insignificant effect of Website quality on brand knowledge is possibly due to the low variations in Website quality across the studied brands. Conventional retailers have different constraints and preferences in store size, layout, ambience, or display shelf arrangement, and these factors lead to substantial variations in store images, which might directly affect consumers' brand impressions and knowledge. However, professional e-business firms tend to implement high quality Websites with interactive functionality and nice graphics. The quality of the Website itself might not be a strong cue in differentiating the brands for consumers. Of course, if a particular brand implements a poor Website, it is still possible for consumers to form a strong (negative) brand impression. Given the relatively low cost in setting up and maintaining a high quality Website (cf. building an impressive retail store), we might expect an overall lesser importance of Website quality in shaping consumers' brand knowledge.

The results on product or technology leadership suggest that online firms that bring in innovative products or technologies might want to highlight the qualitative benefits brought about by the new innovations. For the purpose of building brand equity, it is more practical to "attach" a new innovation to the product rather than the brand.

Regarding the formation of brand equity, we find that the traditional brand equity factors—perceived quality and brand knowledge—continued to play important roles in e-business contexts. In fact, in our model, these two factors together explained 49 percent of the variance of brand equity. This shows quite a strong explanatory power by the two attitudinal measures. Further research should identify other factors that contribute to online firms' brand equity.

Our marketing mix factors jointly explained substantial variations in both perceived quality and brand knowledge. However, the Internet has continually sparked new business practices and marketing models. It would be interesting to see if such innovative concepts help in changing consumers' perceptions that would ultimately be translated into brand equity.

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